UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,721	03/24/2004	Wenzhe Luo	021653-004300US	5625

20350 7590 07/05/2005

TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER	
JEAN PIERRE, PEGUY	

ART UNIT	PAPER NUMBER
2819	

DATE MAILED: 07/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/808,721	LUO, WENZHE
	Examiner	Art Unit
	Peguy JeanPierre	2819

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hodges (4,200,863) in view of Lee (USP 5,416,485).

Hodges et al. disclose in Figure 18, an apparatus for converting analog signal to a digital signal that comprises a plurality of capacitors (2^m) (see Figure). Each capacitor comprises a first terminal and a second terminal. The first terminals (one, three, five, seven...) are connected together and to an input terminal of an operational amplifier (34). The second terminals (two, four, six...) of the capacitor are connected to receive either a first voltage which is a ground voltage that is also connected to a second input of the operational amplifier, a reference or second voltage, an analog voltage (Vin) associated with an analog signal, a third voltage. The third voltage originates from a resistor string that comprises a plurality of resistors serially connected. One end of a first resistor is connected to ground and another end is connected to the reference or second voltage. The system comprises a successive approximation register (SAR) (see

Figure) that generates a fourth voltage (Vx), that is adjusted in response to information associated with the analog voltage (see Fig. 3) and determines with the analog input signal the digital bits (see output bit from SAR) (see Fig.2; col. 3, line 52 to col. 4, line 4. The fourth voltage is also associated with a first voltage level (see Fig. 18 switch S1), a second and a third voltage levels of the capacitors (see Fig. 18 switch S7), that are selected from a group consisting of the first voltage, the second voltage and the third voltage. It is to be noted from the Figure 17 that not 2m-1 capacitors terminals are connected to the second voltage and the first voltage (see switches 42-48; capacitor "C" closer to the comparator (34) is not connected to the first voltage and the second voltage). It is also to be noted that the switches operate to couple and decouple the capacitors terminals namely (second, fourth, sixth...) to the first to fourth voltages; and they are controlled by the SAR that generate the fourth voltage. Based on the magnitude of the fourth voltage with regard to the analog voltage some of the switches will be closed if the digital bit is "1", i.e. coupled to the capacitors; and some if the digital bit is "0", i.e. decouple from the capacitors. Hodges fails to teach that the plurality of resistors have substantially equal value, the capacitance of the capacitors have the same capacitance; an operational amplifier.

Lee discloses in Figure 2 an analog to digital converter that comprises a resistor string (52) whose plurality of resistors have equal values (see col. 4, lines 2-4), a plurality of capacitors (65a-d) that are coupled to an input of an operational amplifier (66) whose capacitance values are the same (see col. 4, lines 21-31). The system of Lee will increase the resolution and the sampling rate of the analog to digital converter without

excessive differential and integral non-linearity. Therefore, it would have been obvious to one having ordinary skill in the art to modify the converter of Hodges by substituting the equal value resistors and equal value capacitance as taught by Lee to improve performance and accuracy in SAR analog to digital converter.

Response to Arguments

4. Applicant's arguments filed on 6/13/2005 have been fully considered but they are not persuasive. Applicant argues that the combination of references (Hodges and Lee) is improper. The Examiner disagrees. Both references disclose capacitive analog to digital converter that comprises an array of capacitors. Hodges reference recites an array of capacitors that has different capacitive values whereas the array of capacitors of Lee has equal value and capacitors. When combined the references meet the claimed language.

Applicant further argues that the Hodges reference relies on differences in capacitance for analog to digital conversion and if the capacitors of Hodges are replaced by equal value capacitors as taught by Lee the operation principle of the converter will change. The Examiner disagrees. The operation of the converter will not change because the converters will operate the same way. The changes will affect the voltages that are charged/discharged onto the converter. This is to be expected since the value of the capacitances change. Hence, replacing the capacitances of Hodges with equal value capacitors will affect the voltage magnitude of the converter.

Applicant contends that if the capacitors of the Hodges reference are replaced, they would not have been able to produce a successive approximation signal Vx which is

connected to a comparator. Applicant has not cited any fact to back up his assertion and the link between the voltages produce by the capacitors and the SAR ADC function is not clear. The Examiner notes that in a SAR ADC a series comparison is performed step by step to set the DAC and wait for it to settle.

Applicant also argues that the terminals (two, four, six...) are capable of being coupled to anyone of a first voltage, an analog voltage, a second voltage and a third voltage. This particular limitation is well detailed in the rejection. The arbitrary numbering of the terminals in the claims cannot be taken into account in determining the connection. However, one end of capacitors in the capacitor array comprises switches that can be coupled to a plurality of voltages.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peguy JeanPierre whose telephone number is (571) 272-1803272-1803. The examiner fax phone number is (571) 273-1803.

Peguy JeanPierre
Primary Examiner